RTI 1.0 Testing Update

presented by RTI IPT

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RTI Performance Testing

- **Performance can be measured on different dimensions based on the user's requirements and use of the RTI**

- **Dimensions of RTI performance**
  - **latency**
  - **throughput**
  - **ownership transfer**
  - **time synchronization**
- **Approaches**
  - **scale-up testing**
  - **performance metrics that cross dimensions of performance**

Scale-up Testing

- **Scale-up tests**
  - scale number of simulated objects per federate
  - scale number of federates per federation execution
- **Test and results presented at AMG-19**
  - Jager federation experiments
  - identified anomalies in performance measure distributions
- **Status of tests**
  - analyzing results of 2 federate experiment to track down anomalies in distribution
  - after anomalies are understood larger scale tests will be performed

RTI Performance Characterization

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How are RTI Performance Characterizations Useful to Federation Developers

- The goal is to start with a federation performance description and produce specific RTI performance expectations
- RTI performance expectations are stated in terms of I/F Specification service invocation frequencies/periods
- Federation performance descriptions are likely stated in the parlance of the FOM
- The Federation Execution Planning Workbook captures the user's performance needs
- From The Workbook we look forward to a direct derivation of RTI performance expectations
- The RTI Performance Metrics are a way to describe RTI performance expectations
- The RTI Performance Benchmarks are a way to measure these values

RTI Performance Metric/Benchmark Goals

- **Performance indicators for each of the major categories of inter-federate exchange through the RTI.**

  - Easy to understand metrics that facilitate comparison and investigation of factors influencing federation performance.

- **Supported by simple and unambiguous tools (benchmark software) that can be applied by general users of the RTI.**

  - Tool source code that can be easily distribution and compiled on all RTI supported platforms.

  - Benchmark programs that are parameterizable using simple command-line arguments and FED file modifications.

Categories of Exchange Measured by the RTI Performance Benchmark Programs

- Attribute value update to attribute value reflection latency expressed in milliseconds.

- Federate output rate expressed in attribute value updates per second per federate and bytes per second per federate.

- Attribute ownership exchange rate expressed in ownership transfers per second per federation.

- Federation time synchronization rate expressed as time advance/grant cycles per second per federation.

Initial Set of
RTI Performance Benchmark Programs

LatencyCheck(federate association data,
number of updates to perform,
size of the updated attribute in bytes)

ThroughPutCheck(number of updates to perform,
size of the updated attribute in bytes)

OwnershipTransferCheck(size of the test federation,
number of exchanges)

TimeSynchronizationCheck(size of the test federation,
number of time step cycles,
increment of federation time)